

What is claimed is:

1. A chlorine-containing gas generant composition comprising:
a nitrogen-containing fuel;
ammonium perchlorate oxidizer; and
a chlorine scavenger present in an amount effective to result in a gaseous effluent that is substantially free of hydrogen chloride when the gas generant is combusted;

wherein at least about 98 weight percent of the chlorine scavenger is a copper-containing compound.
2. The chlorine-containing gas generant composition of claim 1 containing no more than about 1 composition weight percent of a copper-free chlorine scavenger.
3. The chlorine-containing gas generant composition of claim 1 wherein the nitrogen-containing fuel is selected from the group consisting of amine nitrates, nitramines, heterocyclic nitro compounds, and combinations thereof.
4. The chlorine-containing gas generant composition of claim 1 wherein the nitrogen-containing fuel is guanidine nitrate.

5. The chlorine-containing gas generant composition of claim 1 wherein the copper-containing compound is selected from the group consisting of copper nitrate complexes, basic copper nitrate, cupric oxide, and combinations thereof.

6. The chlorine-containing gas generant composition of claim 1 wherein the copper-containing compound is copper diammine dinitrate.

7. The chlorine-containing gas generant composition of claim 1 wherein the copper-containing compound is basic copper nitrate.

8. The chlorine-containing gas generant composition of claim 1 comprising:

about 1 to about 20 composition weight percent ammonium perchlorate;

and

about 80 to about 99 composition weight percent of a precursor blend,

wherein the precursor blend includes the nitrogen-containing fuel and the chlorine scavenger.

9. The chlorine-containing gas generant composition of claim 8 wherein the precursor blend comprises:

about 30 to about 70 composition weight percent of a nitrogen-containing fuel; and

about 30 to about 70 composition weight percent of a chlorine scavenger.

10. The chlorine-containing gas generant composition of claim 9 wherein the precursor blend further comprises up to about 10 composition weight percent of at least one metal oxide burn rate enhancing and slag formation additive.

11. The chlorine-containing gas generant of claim 10 wherein the metal oxide burn rate enhancing and slag formation additive is selected from the group consisting of silicon dioxide, aluminum oxide, zinc oxide, and combinations thereof.

12. The chlorine-containing gas generant of claim 9 wherein the precursor blend further comprises up to about 10 composition weight percent of at least one compound effective to enhance combustion of ammonium perchlorate.

13. The chlorine-containing gas generant of claim 12 wherein the combustion enhancer is selected from the group consisting of iron oxide, copper chromite, Iron Blue pigments, and combinations thereof.

14. The chlorine-containing gas generant of claim 12 wherein the combustion enhancer is an Iron Blue pigment.

15. The chlorine-containing gas generant composition of claim 9 wherein the precursor blend comprises: guanidine nitrate fuel; and a chlorine scavenger including copper diammine dinitrate.

16. The chlorine-containing gas generant composition of claim 9 wherein the precursor blend comprises: guanidine nitrate fuel; and a chlorine scavenger including basic copper nitrate.

17. A method for generating an inflation gas for inflating an airbag cushion of an inflatable restraint system of a motor vehicle comprising the steps of:

igniting the chlorine-containing gas generant composition of claim 1 to produce a quantity of inflation gas; and

inflating the airbag cushion with the inflation gas.

18. The method of claim 17 wherein the inflation gas is substantially free of hydrogen chloride.

19. The method of claim 17 wherein the chlorine-containing gas generant composition contains no more than about 1 composition weight percent of a copper-free chlorine scavenger.

20. The method of claim 17 wherein the chlorine-containing gas generant composition comprises:

about 1 to about 20 composition weight percent ammonium perchlorate oxidizer; and

about 80 to about 99 composition weight percent of a precursor blend;

wherein the precursor blend includes the nitrogen-containing fuel and the chlorine scavenger.

21. A chlorine-containing gas generant composition providing an improved gaseous effluent, comprising:

about 1 to about 20 composition weight percent ammonium perchlorate oxidizer; and

about 80 to about 99 composition weight percent of a precursor blend including:

guanidine nitrate fuel; and
a chlorine scavenger in an amount effective to result in a gaseous effluent substantially free of hydrogen chloride,
wherein at least about 98 weight percent of the chlorine scavenger is a copper-containing compound.

22. The chlorine-containing gas generant composition of claim 21 wherein the precursor blend includes:

about 30 to about 70 composition weight percent of guanidine nitrate fuel; and

about 30 to about 70 composition weight percent of a chlorine scavenger.

23. The chlorine-containing gas generant composition of claim 21 containing no more than about 1 composition weight percent of a copper-free chlorine scavenger.

24. The chlorine-containing gas generant composition of claim 21 wherein the copper-containing compound is copper diammine dinitrate.

25. The chlorine-containing gas generant composition of claim 21 wherein the copper-containing compound is basic copper nitrate.

26. A method for generating an inflation gas for inflating an airbag cushion of an inflatable system of a motor vehicle comprising the steps of:

igniting the chlorine-containing gas generant composition of claim 21 to produce a quantity of inflation gas; and
inflating the airbag cushion with the inflation gas.

27. The method of claim 26 wherein the precursor blend comprises:
about 30 to about 70 composition weight percent guanidine nitrate fuel;
and
about 30 to 70 composition weight percent of a chlorine scavenger.

28. The method of claim 26 wherein the inflation gas is substantially free of hydrogen chloride.

29. The method of claim 26 wherein the precursor blend additionally comprises a metal oxide burn rate enhancing and slag formation additive selected from the group consisting of silicon dioxide, aluminum oxide, zinc oxide and combinations thereof.

30. The method of claim 29 wherein the precursor blend comprises:
about 30 to about 60 composition weight percent guanidine nitrate;
about 30 to about 68 composition weight percent copper diammine
dinitrate; and
silicon dioxide in an amount up to about 10 composition weight percent.

31. The method of claim 29 wherein the precursor blend comprises:
about 35 to about 60 composition weight percent guanidine nitrate;
about 30 to 60 composition weight percent basic copper nitrate; and
at least one metal oxide burn rate enhancing and slag formation additive
in an amount up to about 5 composition weight percent.

32. The method of claim 31 wherein the precursor blend further
comprises at least one combustion enhancer selected from the group consisting of iron
oxide, copper chromite, Iron Blue pigments, and combinations thereof in an amount
up to about 5 composition weight percent.

33. The method of claim 31 wherein the precursor blend further
comprises at least one Iron Blue pigment in an amount of up to about 5 composition
weight percent.